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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte OLIVIER LAVASTRE, LAURENT GALLARD,  
and ABBAS RAZAVI*

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Appeal 2009-008127  
Application 10/573,507  
Technology Center 1700

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Decided: December 15, 2009

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Before CATHERINE Q. TIMM, BEVERLY A. FRANKLIN, and  
LINDA M. GAUDETTE, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

I. STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 38-48, more particularly, claim 48 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement, and claims 38-47 under 35 U.S.C. § 103(a) as obvious over

Collina (WO 96/11218, published Apr. 18, 1996) in view of Chang (US 6,734,267 B2, issued May 11, 2004), Smith (US 4,587,227, issued May 6, 1986), and Liu<sup>1</sup> ("Polymer-incorporated iron catalysts for ethylene polymerization – a new approach to immobilize iron olefin catalysts on polystyrene chains," *New J. Chem.* 26, 1485-1489 (2002)). We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

The invention relates to a method of preparing bimodal polyethylene polymers using two polymerization zones. In the first polymerization zone, hollow beads of polyethylene of controlled morphology and size are formed using an iron based catalyst supported on polystyrene beads. In the second polymerization zone, bimodal polyethylene is formed using a catalyst supported by the hollow beads of polyethylene formed in the first polymerization zone. (Spec. 3, l. 13 through Spec. 4, l. 13.) The following claims illustrate the subject matter on appeal:

38. A method for preparing bimodal polyethylene polymer comprising:

combining porous polyethylene beads with polymerization catalyst component and subjecting the combination to reduced pressure thereby obtaining supported catalyst;

washing the supported catalyst;

supplying the supported catalyst to a second reaction zone;

maintaining the second reaction zone under conditions effective to obtain bimodal polyethylene polymer; and

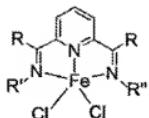
obtaining bimodal polyethylene polymer.

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<sup>1</sup> The Examiner and Appellants mistakenly refer to the Liu reference as "Lin." We deem such a mistake to be harmless error.

39. The method of claim 38 further comprising preparing the porous polyethylene beads in a first reaction zone.

41. The method of claim 40 further comprising preparing the porous polyethylene beads in a first reaction zone by contacting ethylene monomer with an iron based catalyst complex represented by the formula (I):



wherein R is an alkyl having from 1-20 carbon atoms and R' and R'' are the same or different and are an alkyl group having from 1-20 carbon atoms or an unsubstituted or substituted aryl group having at least one substituent [sic] of at least 1-20 carbon atoms; and wherein the catalyst complex is covalently bound to and supported on porous polystyrene beads.

44. The method of claim 43 wherein R' and R'' are the same phenyl group.

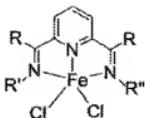
45. The method of claim 44 wherein R' and R'' are substituted with substituents at the 2 and 6 positions.

46. The method of claim 45 wherein the substituents are selected from the group consisting of methyl, isopropyl and tertiary butyl.

47. The method of claim 45 wherein the substituents are isopropyl groups.

48. A method for preparing bimodal polyethylene polymer comprising:

combining under pressure porous polystyrene beads with a catalyst represented by the formula (I)



wherein R is a methyl group and R' and R" are phenyl groups both substituted at the 2 and 6 positions with methyl, isopropyl or tertiary butyl groups;

- obtaining styrene supported catalyst;
- washing the styrene supported catalyst;
- supplying the styrene supported catalyst to a first reaction zone;
- maintaining the first reaction zone under conditions effective to obtain porous polyethylene beads;
- combining the porous polyethylene beads with polymerization catalyst component and subjecting the combination to reduced pressure thereby obtaining supported catalyst;
- washing the supported catalyst;
- supplying the supported catalyst to a second reaction zone;
- maintaining the second reaction zone under conditions effective to obtain bimodal polyethylene polymer; and
- obtaining bimodal polyethylene polymer.

## II. FIRST REJECTION – WRITTEN DESCRIPTION (CLAIM 48)

### A. ISSUE ON APPEAL

The Examiner contends that the Specification does not provide support for preparing a “styrene supported catalyst” because styrene is a liquid at room temperature and cannot function as a support (Ans. 3). The Examiner also contends that the Abstract only teaches hollow polyethylene

beads and that Figure 3 does not teach impregnation of the polystyrene beads with a catalyst “under pressure” or that polystyrene beads are porous (Ans. 4). According to the Examiner, the term “beads” implies a smooth not porous surface and that the catalyst must be supported by chemical bonds due to the lack of pores (Ans. 4).

The Appellants assert that support for the contested limitations of claim 48 can be found in the Specification at the Abstract, Figure 3, and paragraphs 20-21 (page 3, line 26 to page 4, line 14) and paragraphs 27-30 (page 4, line 17 to page 5, line 14) (Br. 3-4).

The first issue on appeal arising from the contentions of Appellants and the Examiner is: have Appellants shown that the Examiner reversibly erred in rejecting claim 48 because the Specification provides adequate written descriptive support for (a) a “styrene supported catalyst,” (b) “porous polystyrene beads” and (c) combining the polystyrene beads and the iron based catalyst “under pressure”? We answer this question in the negative only with respect to (c).

## B. FACTUAL FINDINGS

The following Findings of Fact are relevant to deciding the present issue on appeal.

Appellants’ Specification discloses the step of “providing a supported catalyst component wherein the support is a porous functionalized bead of polystyrene and wherein the catalyst component is covalently bound to the support and is an iron based complex of general formula (I)” (Spec. 3, ll. 27-30)

The Abstract is only directed to the step of forming bimodal polyethylene using the polyethylene hollow bead catalyst support and does

not disclose any of the steps of forming the polyethylene beads using polystyrene bead catalyst support (Spec. Abstract).

Figure 3 describes that the polymerization of polyethylene from the polystyrene supported catalyst occurs at 20 bar, but does not indicate any pressure requirements for the first step of “impregnation” of polystyrene beads by the catalyst (Spec. Figure 3).

Appellants’ Specification describes the steps of adding a solution of the desired catalyst component to dry hollow polystyrene beads “under vacuum and at room temperature (about 25 °C)” and slowly bringing the impregnated hollow beads back to atmospheric pressure in order to further increase the amount of catalyst component absorbed (Spec. 5, ll. 19-24; *see also* Spec. 11, ll. 17-21 (disclosing the step occurring “under reduced pressure”)).

Pages 3-5 of Appellants’ Specification do not disclose combining the porous polystyrene beads with the catalyst under positive pressure (*see generally* Spec. 3-5).

Appellants’ Specification does not use the phrase “under pressure” or provide the term any special meaning (*see generally* Spec.).

#### C. PRINCIPLES OF LAW

During examination, “claims . . . are to be given their broadest reasonable interpretation consistent with the specification, and . . . claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art.” *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004)(quoting *In re Bond*, 910 F.2d 831, 833 (Fed. Cir. 1990)). “The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from

which to begin claim interpretation.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005).

The initial burden of establishing a prima facie case of lack of written description rests with the Examiner. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). However, the initial burden is discharged by the Examiner if the Examiner establishes the fact that Appellant is claiming embodiments completely outside the scope of the Specification. *See In re Alton*, 76 F.3d 1168, 1175 (Fed. Cir. 1996). “Once the applicant is so notified, the burden shifts to the applicant to rebut the prima facie case with evidence and/or argument.” *Hyatt v. Dudas*, 492 F.3d 1365, 1370 (Fed. Cir. 2007).

Adequate written description means that, in the specification, the applicant must “convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the [claimed] invention.” *Id.* (*quoting Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991)); *see also In re Kaslow*, 707 F.2d 1366, 1375 (Fed. Cir. 1983) (“The test for determining compliance with the written description requirement is whether the disclosure of the application as originally filed reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter, rather than the presence or absence of literal support in the specification for the claim language.”).

#### D. ANALYSIS

We agree with Appellants that the Specification discloses using “porous functionalised beads of polystyrene” as a support for the claimed catalyst, whether supported physically via impregnation into the pores of the beads, chemically by covalent bonding, or both. However, we fail to find, and Appellants have not shown where, the Specification supports combining

the catalyst and polystyrene beads “under pressure.” We understand the term “under pressure” commonly means under positive pressure, and Appellants’ Specification provides us no reason to depart from this meaning.

None of the Abstract, Figure 3, or pages 3-5 of Appellants’ Specification discloses combining the polystyrene beads and the catalyst under positive pressure. To the contrary, Appellants’ Specification teaches that the polystyrene beads and catalysts are combined “under vacuum,” *i.e.* under negative pressure. Accordingly, we agree with the Examiner that claim 48 is not adequately supported by the written description.

### III. SECOND REJECTION – OBVIOUSNESS (CLAIMS 38-47)

#### A. ISSUE ON APPEAL

Appellants contend that Collina does not teach supplying a styrene supported iron based catalyst to a first reaction zone to form polyethylene beads, as recited in claims 39 and 46, but rather teaches a first stage using a titanium or vanadium catalyst, deactivating the titanium or vanadium catalyst and supporting a metallocene compound on the olefin polymer produced in the first stage for polymerization in the second stage (Br. 4-5).

Appellants also contend that Liu does not teach a catalyst component wherein R' and R" are substituted with isopropyl groups at the 2 and 6 positions, as recited in pending claim 45. According to Appellants, Liu teaches pyridine substituents rather than isopropyl groups at the 2 and 6 positions. (Br. 5.)

The Examiner responds that claims 38-40 only require a supported catalyst used to form polyethylene beads in a first stage, which is satisfied by the multistage process of Collina (Ans. 5, 6-7). The Examiner also contends that the particular iron based catalyst of claims 41-47 are taught by

Liu, which teaches a styrene supported iron based catalyst of formula (I) with isopropyl ('Pr) substituents at the 2 and 6 positions of the phenyl groups in the R' and R" positions (Ans. 7).

Appellants state that their arguments are directed to claims 39, 45, and 46 (Br. 4-5). However, Appellants' arguments do not appear to correspond to the recited claim numbers. For example, Appellants argue claims 39 and 46 as requiring supplying a styrene supported iron based catalyst to a first reaction zone to form polyethylene beads (Br. 4). Yet, claim 39 is directed to preparing porous polyethylene in a first reaction zone, but does not require an iron based catalyst (claim 39). Claim 46, which depends from, among others, claims 41, 43, and 44, is directed to the use of particular substituents at the 2 and 6 position of the phenyl groups constituting R' and R" in Formula (I) recited in claim 41. Accordingly, we select claim 39 (directed to forming polyethylene beads in a first reaction zone) and claim 41 (using an iron based catalyst in the first reaction zone) to represent the issue on appeal resulting from this argument.

Likewise, Appellants argue that claim 45 requires the use of isopropyl groups at the 2 and 6 positions, which is instead the subject matter of claims 46 and 47. Accordingly, we select claim 46 (having isopropyl substituents at 2 and 6 positions of the phenyl groups forming R' and R" of Formula (I) of claim 41) to represent the issue on appeal resulting from this argument.

Thus, the second issue on appeal arising from the contentions of Appellants and the Examiner is: have Appellants shown that the Examiner reversibly erred in finding (a) that Collina teaches forming a polyethylene from a supported catalyst in a first reaction zone, as required by claim 39; (b) that Liu teaches using the iron based catalyst supported by a styrene as

recited in claim 41 and (c) that Liu teaches an iron based catalyst with isopropyl substituents at the 2 and 6 positions, as recited in claim 46?

#### B. FACTUAL FINDINGS

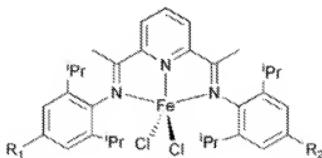
The following additional Findings of Fact are relevant to deciding the present issue on appeal.

The Examiner has found that Collina teaches one or more olefins are polymerized in the presence of a second metallocene catalyst impregnated into olefin polymer particles from a first stage, which are formed using titanium catalysts supported on MgCl<sub>2</sub> (Ans. 5; *see Collina, Abstract and p. 7, ll. 1-4*). Appellants appear to agree with the Examiner as to the teachings of Collina (Br. 4-5).

The Examiner relies on the teachings of Liu to disclose a styrene supported iron based catalyst which meets general Formula (I) for the formation of polyethylene (Ans. 5-6, and 7).

Scheme 1 of Liu discloses an iron based catalyst meeting general formula (I) with methyl groups in the R position and phenyl groups in the R' and R" positions (Liu, Scheme 1, at 1486).

Liu teaches the catalyst of Scheme 1 is 2,6-diacetylpyridine bis(4-allyl-2,6,*diisopropylaniline*) iron dichloride (Cat-1) (Liu, at 1486, col. 2, ¶ 2.4.3 (emphasis added)). Scheme 1 of Liu shows this catalyst having the following chemical structure:



In other words, the <sup>1</sup>Pr represented in Scheme 1 are isopropyl groups at the 2 and 6 positions of the phenyl groups (Liu, Scheme 1, at 1486; *see also* Schemes 2 and 3, at 1487).

C. PRINCIPLES OF LAW

“On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.”

*In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) (emphasis omitted).

One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).

D. ANALYSIS

Appellants present no arguments intended to show Examiner error in the rejection of claim 38. As such, Appellants have failed to establish that the Examiner reversibly erred with regard to claim 38, and we summarily sustain the Examiner’s rejection of claim 38. *See* 37 C.F.R. § 41.37(c) (1)(vii) (“Any arguments or authorities not included in the brief or a reply brief filed pursuant to § 41.41 will be refused consideration by the Board, unless good cause is shown.”).

We agree with the Examiner that claim 39 does not require the use of an iron-based catalyst. Thus, with respect to claim 39, Appellants’ arguments directed to the use of an iron based catalyst do not address the limitations of claim 39. To the extent that Appellants are arguing that Collina does not teach supplying a supported catalyst to a first reaction zone to form porous polyethylene beads and then combining those porous polyethylene beads with catalyst and supplying the polyethylene supported

catalyst to a second reaction zone, Appellants appear to agree with the Examiner's finding that Collina teaches a process including a first stage (first reaction zone) in which porous olefin polymer particles are produced using a titanium catalyst (a supported catalyst) and another stage where the porous polyolefin particles from the first stage are used as a support for a metallocene catalyst (supported catalyst) to form additional polyolefins (Br. 4-5). Thus, Appellants have failed to show how Collina fails to teach the elements of claim 39.

Claim 41 requires that the catalyst in the first reaction zone is an iron based catalyst having the structure of formula (I). While Appellants rightly assert that Collina does not teach the claimed iron based catalyst, the Examiner relies on the teachings of Liu to teach the particular iron based catalyst recited in these claims. Non-obviousness cannot be established by attacking Collina individually where the rejection is based upon the teachings of a combination of Collina, Chang, Smith, and Liu. Appellants do not address the Examiner's specific rejection articulated in the Answer or present any arguments as to why the Examiner erred in combining the teachings of Collina and Liu. Thus, Appellants fall short of rebutting the Examiner's *prima facie* case of obviousness, which we find to be reasonable.

Regarding claim 46, we agree with the Examiner's findings that the <sup>i</sup>Pr indication in Scheme 1 of Liu refers to isopropyl groups, and not pyridine groups, as suggested by Appellants. Accordingly, Liu further teaches the structure of claims 46 and 47.

#### IV. CONCLUSION

For the reasons discussed above, we sustain the Examiner's rejections of claim 48 under 35 U.S.C. § 112, first paragraph, as failing to comply with

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the written description requirement, and claims 38-47 under 35 U.S.C.  
§ 103(a) as obvious over Collina in view of Chang, Smith, and Liu.

#### V. DECISION

We affirm the Examiner's decision.

#### VI. TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with  
this appeal maybe extended under 37 C.F.R. § 1.136(a)(1)(iv).

**AFFIRMED**

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